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# TRIAD'S COMMON SENSE APPROACH

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# Objectives



- Provide an overview of the triad approach and its application
- Describe the elements of the triad approach for practical application
- Describe recent experiences (including successes/ challenges) where the triad approach was used at a military facility

# Before there was Triad...

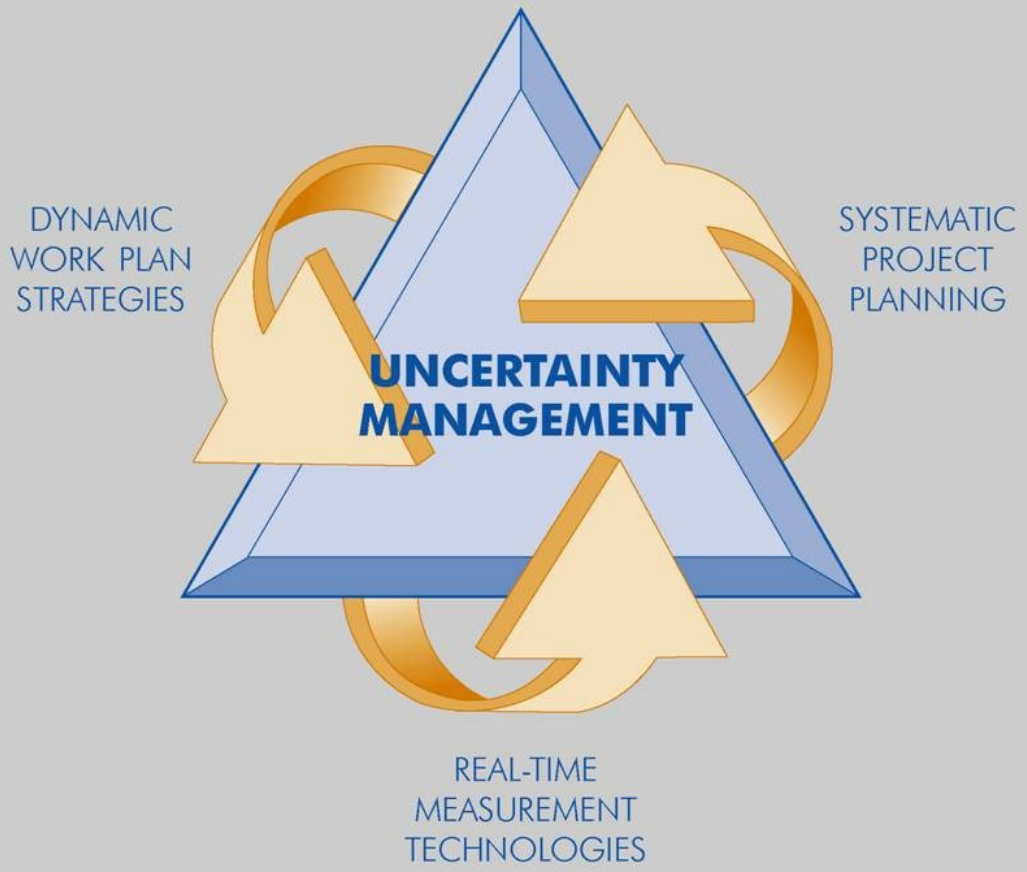


- DOE's "Expedited Site Characterization" (ESC) and "Streamlined Approach for Environmental Restoration" (SAFER)
- USACE's "Technical Project Planning (TPP) Process"
- Argonne National Laboratory's Adaptive Sampling and Analysis Programs (ASAP)

# What is TRIAD?



- USEPA initiative to improve decision quality
- Reported cost savings from 15 to 50 percent
- Reported time savings from 30 to 60 percent
- Case studies indicate generation of more useful data



# Triad's Application



- Managing uncertainty
- Focus on overall decision quality as the overarching goal
- Developing an accurate conceptual site model (CSM)

# Systematic Project Planning



- Most important and applicable of the triad elements
- Requires greater time and energy on up-front planning
  - Basis for creating a defensible approach and scientifically sound data set
  - Framework to ensure that the data collected are sufficient for site needs

# Systematic Project Planning (continued)



- Requires asking the right questions and strategizing how best to answer them
- Uses multi-disciplinary, experienced technical staff to develop technical objectives (DQOs)
- Development of project planning documents to articulate approach to meet DQOs
  - Work Plan
  - Quality Assurance Project Plan
  - Sampling and Analysis Plan

# Dynamic Field Activities

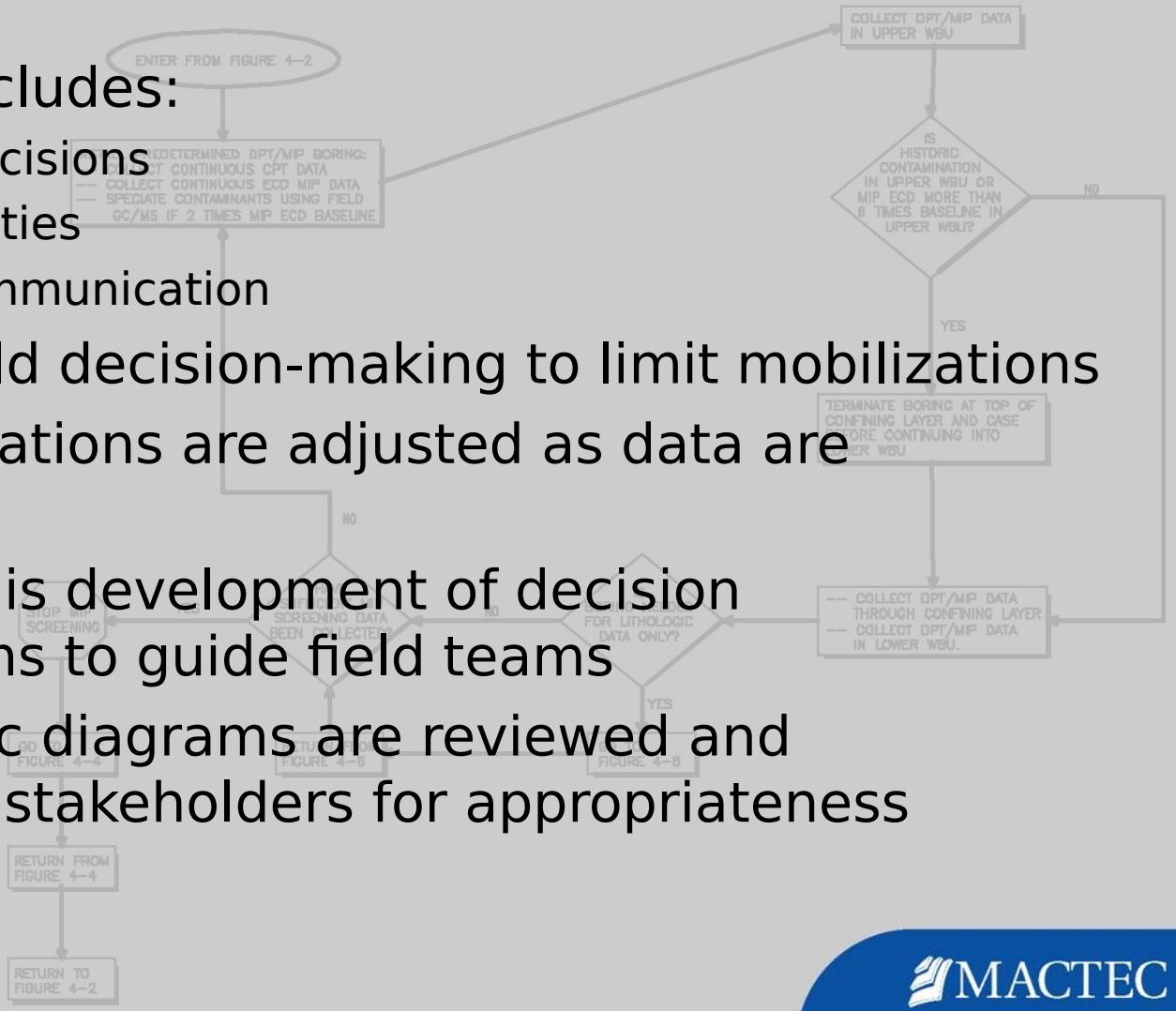


- Can have the greatest impact on cost and time savings
- Flexible Approach with application to:
  - Any type of field work
    - Site Screening
    - Characterization
    - Remediation
    - Monitoring
  - Any type of regulatory framework
    - CERCLA (removal or remedial)
    - RCRA corrective action
    - State Superfund
    - Leaking USTs
    - Brownfields

# Dynamic Field Activities (continued)



- Work plan includes:
  - Logic for decisions
  - Responsibilities
  - Lines of communication
- Real-time field decision-making to limit mobilizations
- Sampling locations are adjusted as data are generated
- Key element is development of decision logic diagrams to guide field teams
- Decision logic diagrams are reviewed and approved by stakeholders for appropriateness


ENTER FROM FIGURE 4-2
COLLECT DPT/MIP DATA IN UPPER WBU
IS HISTORIC CONTAMINATION IN UPPER WBU OR MIP ECD MORE THAN 8 TIMES BASELINE IN UPPER WBU?
NO
YES
TERMINATE BORING AT TOP OF CONFINING LAYER AND CASE
-- COLLECT DPT/MIP DATA THROUGH CONFINING LAYER
-- COLLECT DPT/MIP DATA IN LOWER WBU.
NO
YES
RETURN FROM FIGURE 4-4
RETURN TO FIGURE 4-2

# Real-Time Measurement



- Key component of maximizing information value while minimizing cost
- Often requires a variety of sampling and analytical techniques
  - Field test kits
  - Field instrumentation
  - Rapid sampling platforms
  - In-situ detection technologies
  - Rapid turn around from fixed-base laboratory (using definitive or screening analytical methods)
- Includes software programs to manage, interpret, display, and map data in real-time

# Real-Time Measurement (continued)



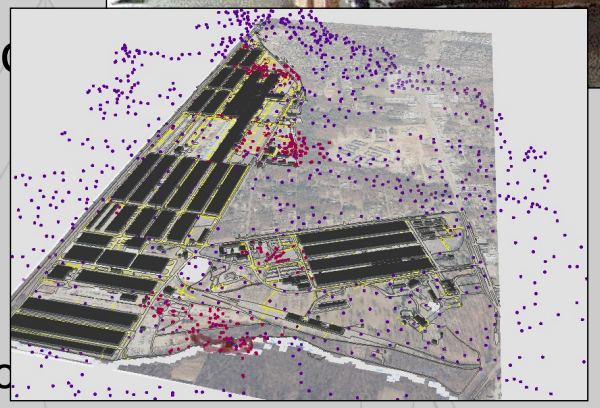
- Often requires collection of collaborative data
  - Demonstration of technologies to understand variability of contamination prior to full-scale field work commencement
  - Comparison of fixed-base lab data to field screening methods
  - Determination of confirmatory sampling program

# Triad Summary



- Systematic project planning…
  - …ensures that the end goal is clearly defined
- Dynamic work plan strategies…
  - …guides project team in making decisions in the field about how activities will progress
- Real-time measurement…
  - …makes dynamic work plans possible

# Project Example



- Site: Defense Supply Center Richmo
  listed on the NPL in 1987
- Incomplete CSM
  - Complex geochemical and hydrogeological conditions
  - Chlorinated solvent contamination in gro water, including suspected residual DNAPL
  - Unique site geochemistry
  - Uncharacterized groundwater/surface water interactions
  - Potential for vapor intrusion into occupied buildings
  - Off-installation groundwater contamination
- Unclear exit strategy
- Inadequate remedy performance
- Lack of public confidence

# Project Example (continued)



- Systematic Project Planning:
  - Development of a technical team with engineering, geology, hydrogeology, chemistry, and biology disciplines
  - Development of appropriate planning documents: dynamic work plan, QAPP, SAP
- Dynamic Field Activities:
  - Field program used formal decision logic to guide decision-making
- Real-time measurement:
  - Geophysics
  - Chemical screening
  - Lithologic screening
- Results to be presented at 9th Annual Joint Services Environmental Management Conference & Exhibition, San Antonio, TX, August 2004

# Successes



- Core technical team cohesiveness
- Stakeholder concurrence prior to field activities rather than after
- Delineation real-time
- Reduction of mobilization costs
- Use of decision trees
  - Planned potential field deviations (with corrective action) before mobilization
  - Ability to modify program during process without lengthy regulatory review process

# Challenges



- Significant planning effort required
  - Required senior personnel to participate in initial field activities
- Dynamic schedule and activities limit long-term planning
  - Cost prediction and control
  - Subcontractor procurement
- Screening technologies still evolving
  - Instrument response variability
  - Significant calibration requirements
- Data management and real time interpretation/update of CSM
- Consistent application of decision logic
- Required regulatory agencies to think “outside of the box”

# Sources




- USEPA OSWER 542-F-01-030a, April 2001
- USEPA OSWER 542-R-01-016, October 2001
- USEPA OSWER Memorandum No. 9200.1-40-A, May 7, 2003
- USEPA OSWER “Using the Triad Approach to Streamline Brownfields Site Assessment and Cleanup”, June 2003
- MACTEC Engineering and Consulting, Inc., “Final Supplemental Feasibility Study Work Plan”, January 2004